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PHYSICAL AND PHYSIOLOGICAL OBSERVATIONS ON THE NAVAHO

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The following notes form a portion of the results of the writer's part in the Hyde Expedition to the Pueblo region in 1899, under the direction of Prof. F. W. Putnam, curator of the American Museum of Natural History.

The Navaho Indians, of Athapascan stock, are a numerous,¹ comparatively wealthy,² intelligent, and, on the whole, very promising tribe of Indians occupying a reservation of over 12,000 square miles and the neighboring parts of the country in New Mexico, Arizona, Colorado, and Utah. The principal scientific attention thus far devoted to this important tribe has been by Dr Washington Matthews and by Messrs Backus, Catlin, Eaton, Hodge, Letherman, Schoolcraft, Simpson, Stephen, and Stevenson.³ Most of the recorded observations relate to the customs and mythology of the people. During the work among the Indians, carried on under the direction of Professor Putnam for the World's Columbian Exposition at Chicago, two series of measurements of the Navaho were made, one of adults (by Dr Matthews), the other of school children (by Antonio Apache). I have been accorded permission to incorporate these measurements in the present study. My own work had for its main object an inquiry into the physical and physiological character of the Navaho, and was conducted principally in Chaco canyon. Fifty adult males and thirty adult females were measured and

¹ Various estimated to number from 15,000 to 25,000 individuals. The Eleventh United States Census placed the population at 17,204.

² Individuals range in worth as high as \$10,000.

³ See Matthews, *Navaho Legends*, and bibliography therein.

examined, and photographs and casts of the faces were made. Opportunity was presented for observing the people during a large feast and in different parts of the reservation as well as beyond its borders, and for three weeks I lived with a number of Navaho while conducting excavations. The present paper comprises a summary of this work, supplemented by such general observations as may be necessary to complete the more technical data.

The Navaho show good physical development; excessively strong or naturally feeble individuals are rare, as also are very fat people and those who are congenitally deformed or deficient. The average Navaho male does not exceed in strength the average white man; a large majority of both the men and the women have regular, pleasant features, and individuals of both sexes rise to a certain degree of beauty.

The Navaho show considerable difference in color and measurement, and cannot be considered a radically homogeneous people, but their mixture is not recent. They range in color from light, lusterless tan or quadroon tint to a dark shade of sepia. The men were found to range in height from 162.4 to 183.0 cm., the women from 148.4 to 166.3 cm. The excess of armspread over height averages in men 4.1 cm., in women 3.3 cm. The lower extremities are in men 46.6%, in women 46.8%, of the total body-height. The average chest width of the men at nipple height is 29.7 cm., the depth 21.6 cm. In most cases the head is flattened posteriorly, and this flattening is more frequent and more pronounced in men than in women. So far as can be determined, this flattening is not produced intentionally, but is the result of the pressure of a small pad used on the baby-board as a head-rest. When the child is strapped on the board, the head has little freedom. The flatness of the head is preferred by the Navaho to occipital protuberance. On account of the depression the diameters of the head are distorted. Notwithstanding this, it is plain that most of the members of the tribe are of

brachycephalic type. A few mesocephals and one dolichocephal were found.

The face of the Navaho shows moderate prognathism; the chin is well formed; the nose measures in men 5.38 cm., in women 5.0 cm., in length, and 4.0 cm. and 3.6 cm., respectively, in width, and shows fair height. The malars are generally somewhat prominent. The average height of the face to nasion in men is 12.0, in women 11.3 cm.; to the hair line, in men, 18.9, in women 17.76 cm.; the diameter of the bizygomatic maxillary in men is 14.7, in women 13.8 cm. The hands and the feet, as well as the legs, are smaller in the Navaho than in the whites.

The men pluck the hair on the face, but occasionally wear a mustache. The hair on the head is worn long by both sexes; the women often wear it loose, the men tie it in a knot behind. The color of the hair is frequently brownish or rusty; this is an acquired tint, and may be due to exposure to the sun. The favorite and quite frequent shampooing of the head with suds made from yucca-root may also have some effect on the color of the hair. In the young the hair is invariably jet-black. Navaho children appear for the most part very well nourished and strong. The mother nurses the child up to its second year and sometimes for even a longer period. The adolescents among the Navaho, as among other Indians, are somewhat more advanced toward maturity, on the average, than whites of corresponding age. This is seen in the differentiation of the male and female types, the development of breasts and pelves. Navaho children born of young parents are not appreciably smaller or weaker than other children of corresponding age. The aged do not exhibit such a degree of decrepitude as is usually found among the whites. White hair appears in most cases after fifty years, sometimes later, rarely before. There is no baldness, but aged persons bear a great many wrinkles on their faces. The oldest person heard of was, according to events remembered,

slightly over a hundred years. The oldest individuals actually seen were not over eighty years of age.

The period of puberty in women varies from twelve to fourteen years; the period of menopause could not be ascertained, most of the Navaho not being certain of their age. Childbearing ceases apparently at greatly varying ages.

The women show a much larger amount of adipose tissue than the men, but the proportion does not exceed that observed in the whites. The breasts are usually well developed and of medium size; the form of those of women who have not borne children approaches the hemispherical; the nipple is large, the areola pronounced. The lumbar region shows but slight curve; the gluteal region is broad and rather flat.

The average pulse, respiration, and temperature records obtained are remarkable principally by reason of the low pulse. They are as follows: Pulse, males, 69.2; females, 74.9. Respiration, males, 17.7; females, 19.7. Temperature, males, 98.75° F.; females, 99.1°.

The Navaho can bear prolonged loss of sleep better than the average white, and the same rule applies to extremes in diet and exposure. The Navaho male is an accomplished rider and makes a good driver; and altogether he is a very good, able, and intelligent workman. As a tradesman, however, he is not a success, particularly among his own people. The women are deft weavers, producing the celebrated Navaho blankets. The regular and often beautiful designs on these blankets are individual creations, produced without the aid of actual patterns. Numerous belts, garters, and hair-bands, as well as a few decorated ceremonial baskets, are woven. But little pottery is manufactured, and this consists of unglazed and undecorated cooking utensils. Water-gourds woven from plant fiber and covered with gum are occasionally used, but they are said to be derived from the Ute, among whom they are common. Each Navaho man makes his own moccasins and leggings.

A regular handicraft may be observed in the tribe, namely, silversmithing.

The Navaho lives alone with his family on a ranch, but occasionally two related families may be found in a cluster of hogans or huts. There is a mythological explanation for this mode of living, connected with the ancient Pueblos. A girl becomes marriageable after puberty; a young man may marry when he possesses enough horses or other property to exchange for the girl he desires. The price paid for the girl is divided among her relations, and it represents a test of the abilities of the young man rather than the girl's actual value. Unions are very seldom sterile; the usual number of children is from two to six. Polygamy is still quite prevalent; but the women are very modest, and very little mixture with the whites is found.

The dwellings of the Navaho consist in some cases of a generally temporary hut built of cedar branches or partially of stones; in other instances a more or less conical hut is built of trunks and branches of cedar or pine, covered with earth. Some of the more progressive natives erect rectangular houses of adobe or stone, similar to those most generally constructed by the whites in that section of the country.

The material possessions of the Navaho consist mainly of sheep, goats, and horses. He cultivates little besides corn and, in a few localities, melons and peaches. His diet is irregular and consists principally of bread and meat. Families possessing goats use their milk; coffee is eagerly sought. No information could be obtained of any native fermented drink. The women hold property in their own right.

In his dealings with the white man the Navaho is fairly honest and reliable, but in this respect much depends on the person with whom he deals. In rendering service for profit, the Navaho, like most people, of whatever race, will aim to get as great a return as possible. But the money gained possesses for him only a

temporary value; he will spend his earnings freely, often unnecessarily. To the Navaho hoarding is unknown.

The Navaho is a good guide and a safe companion. His knowledge of the country through which he roams seems almost phenomenal. His disposition is almost invariably bright and cheerful. He knows or will improvise an almost endless number of short songs; but his melodies seem to be rather limited in range, and to the ear of the white person are not altogether pleasant. His sense of humor is keen; modesty is manifested in young children and is pronounced in both men and women. As among other Indians, superstition is prevalent. The Navaho are not demonstrative in their family affection, save in the case of mothers toward their children; nevertheless they seem happy in their family ties. Jealousy exists. The natives of both sexes are fond of personal adornment; women exhibit some degree of coquetry. The men are passionately fond of racing and gaming, and a few of them are inveterate gamblers. The women have few games of their own, but will occasionally participate in a game or a race. The Navaho are not capable of doing business among themselves, through a tendency to suspicion and dissatisfaction. The old are respected and their advice considered. The old women in particular are shrewd and have considerable influence over the young women. Among themselves the people are hospitable. They preserve many legends and traditions and have many interesting dances and ceremonies.

Occasionally a Navaho will commit a crime, usually murder; but in by far the most cases, the deed is the result of drunkenness. Suicide is sometimes undertaken as a result of jealousy, extreme poverty, or drunkenness, and when the subject is a married man he usually also kills his wife and children. In general the Navaho is easily grieved, excited, or angered, but he is not revengeful.

From the medical point of view the Navaho are found to be subject to a number of disorders. Insanity is exceedingly rare; the only case observed or learned of was that of a man about

seventy years of age who was suffering only mild dementia. No case of epilepsy or idiocy could be traced ; there are, however, a few cases of feeble-mindedness.

The most frequent of all disorders of health among the Navaho are stomach and bowel complaints, the causes of which lie in the character and irregularity of the meals, long periods of hunger at one time and excessive feasting at another, and the consumption of much half-baked bread charged with cheap baking-powder. Malaria is rare ; a case of consumption is found occasionally ; rheumatic pains are a frequent subject of complaint ; tumors are very rare. There are many native medicine-men, whose treatment consists of continued incantation and medication. The latter comprises the administration of certain vegetal drugs and of articles supposed to have magic healing power. Charlatanism and deceptive tactics, such as pretending to suck out the cause of the disease, are also engaged in. But little surgery is practiced.

The Navaho know but little about their origin. They pretend to have entered this world from an underworld.¹ My informant spoke of the opening into this world as having been situated in the not far distant La Plata mountains. The early history of the tribe is intimately associated with the *Kisani* or ancient Pueblos. They claim to have occupied regions adjacent to and north of the area of the Pueblos, with whom they were sometimes at war ; but, my informant added, the two were originally the same people.

From physical examination it would appear that the tribe, notwithstanding some evident mixture, is closely allied to the ancient Pueblos and to the short-headed people of today in other parts of New Mexico and Arizona, and possibly in old Mexico.

¹ See Matthews, *Navaho Legends*.